

# First G-APD Cherenkov Telescope

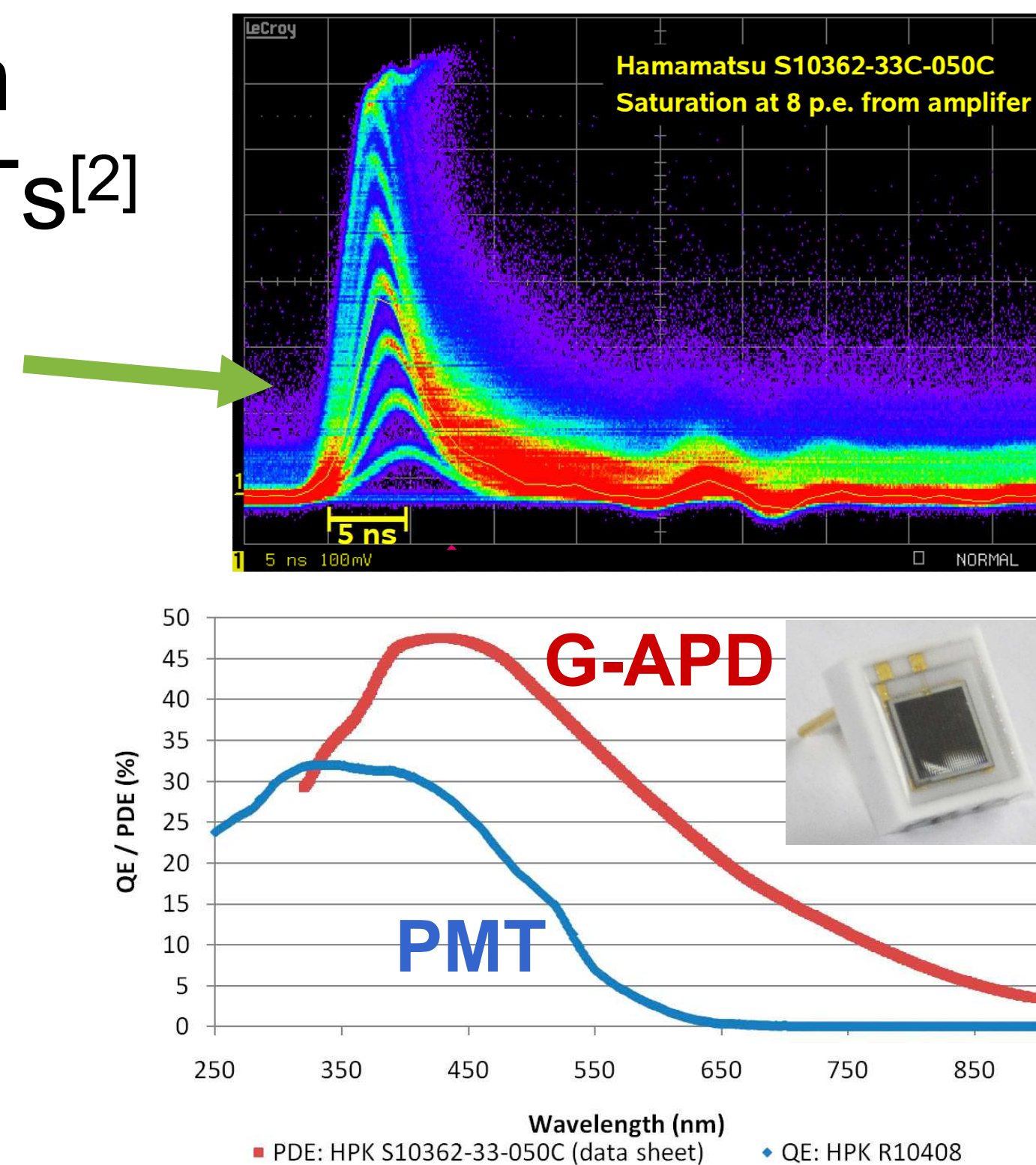
## for ground-based $\gamma$ -ray Astronomy

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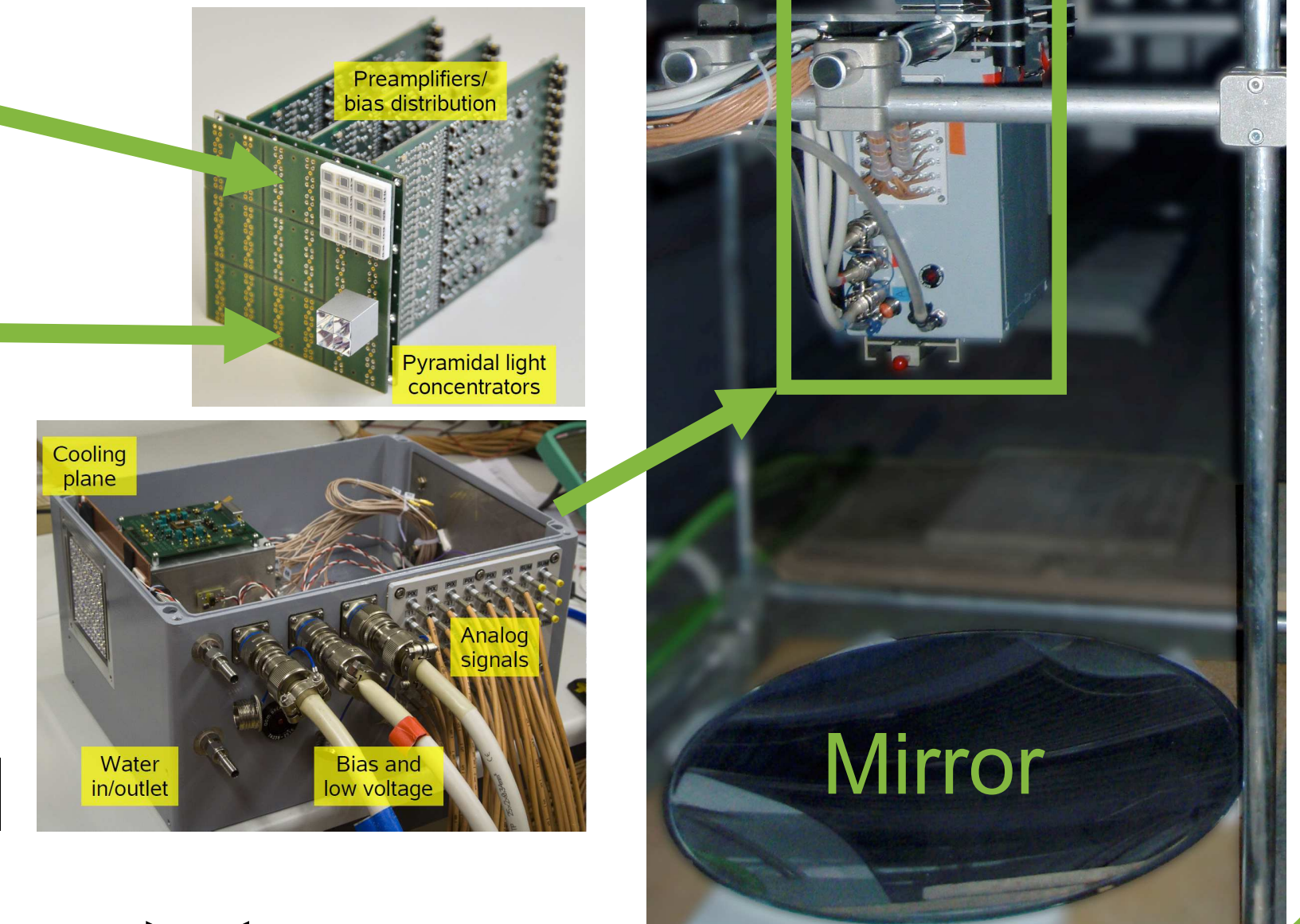
### G-APDs<sup>[1]</sup>

- Novel photosensors with potential to replace PMTs<sup>[2]</sup>
- Single p.e. resolution
- High PDE
- Negligible time-jitter
- Not damaged by bright light
- Very compact & robust
- Not used in IACTs, **yet**



### 36-Pixel Testcamera M0<sup>[3]</sup>

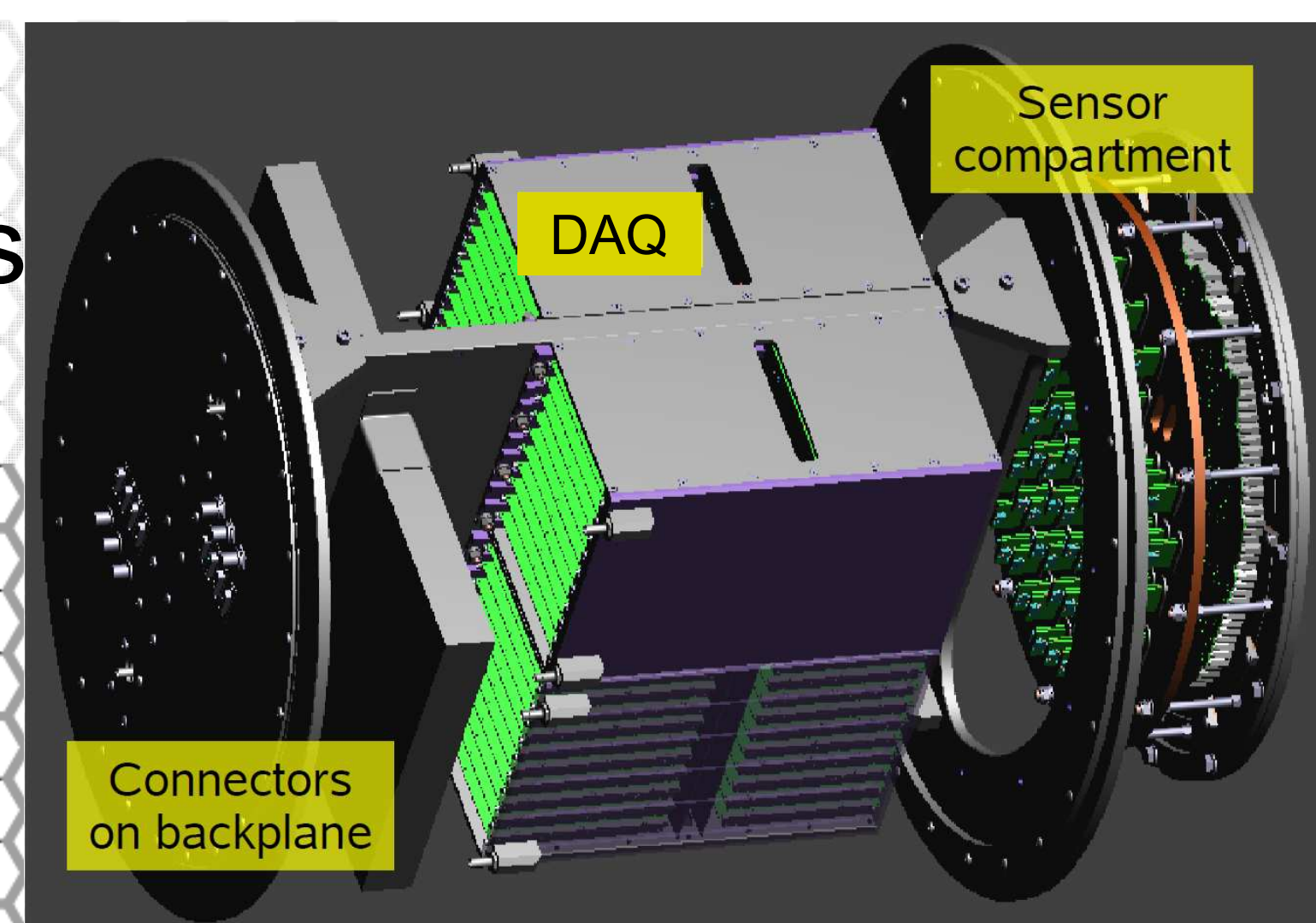
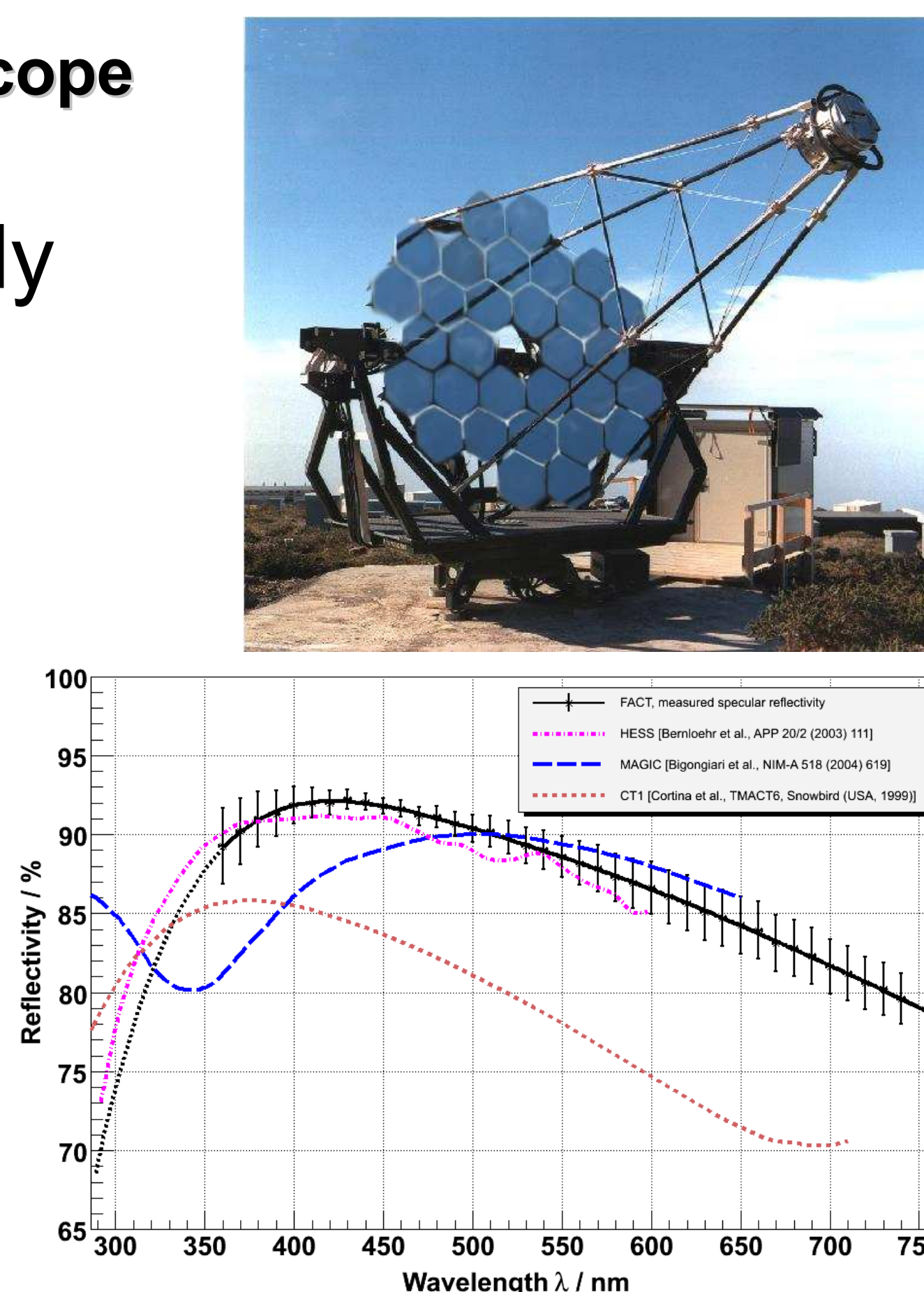
- First test to detect Cherenkov light from air showers with G-APDs<sup>[4]</sup>
- 144 G-APDs
- 36 pixels
- Light-cones
- $\sim 1^\circ$  FoV/pixel
- DRS2 DAQ
- 1.2GHz NSB/pixel



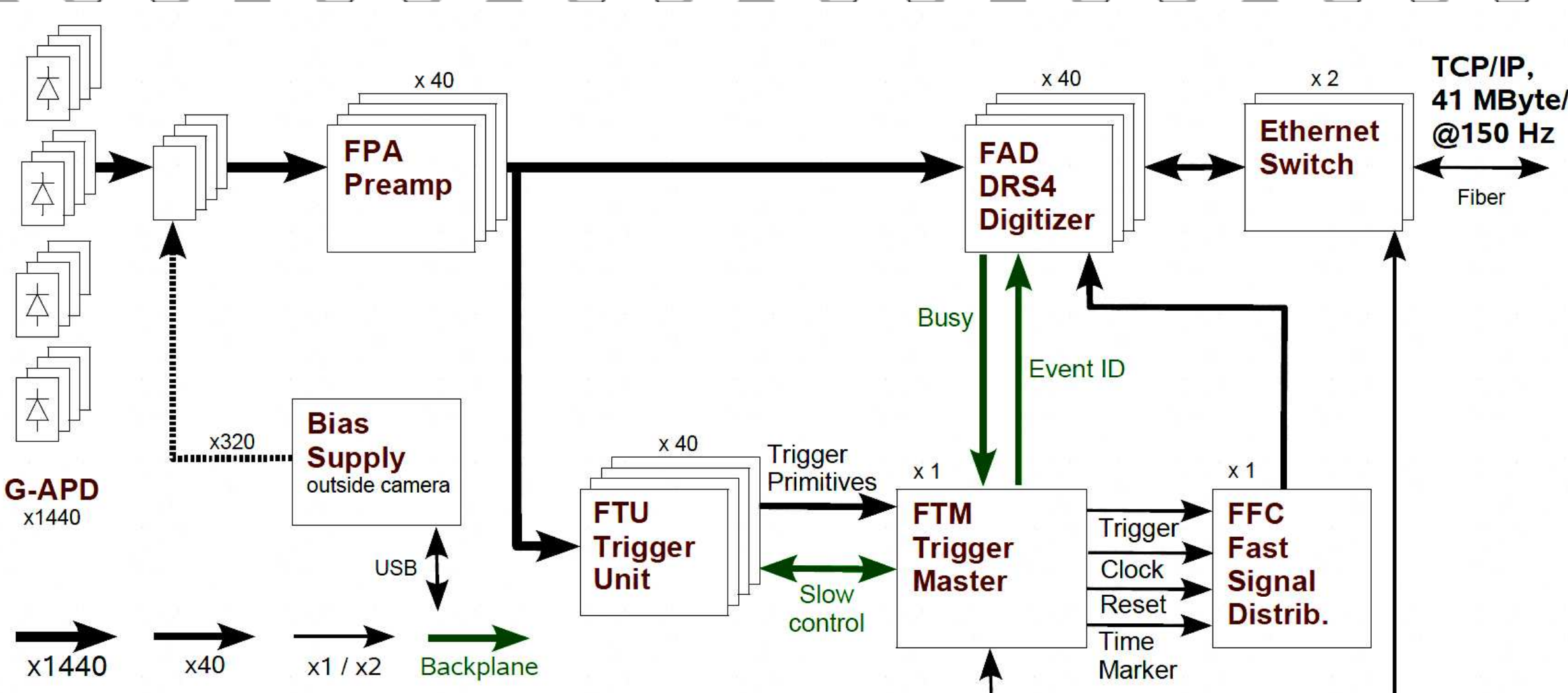
### FACT<sup>[6,7]</sup>

First G-APD Cherenkov Telescope

- Telescope Mount already on La Palma
- Microcontroller based Drive System
- 9m<sup>2</sup> Aluminum Mirrors
- G-APD Camera:
  - 1440 Pixel
  - Fully integrated DAQ
  - Based on DRS4
  - 2GHz sampling
  - Analog sum of groups of 9 pixels for trigger

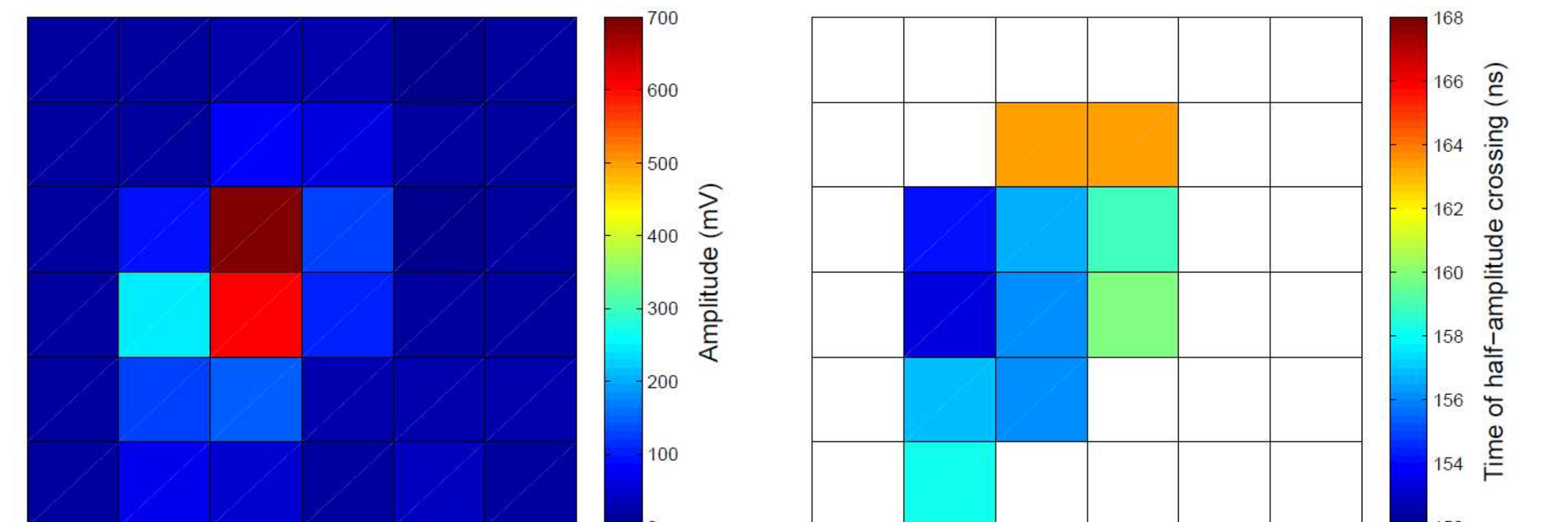


original size (38cm)

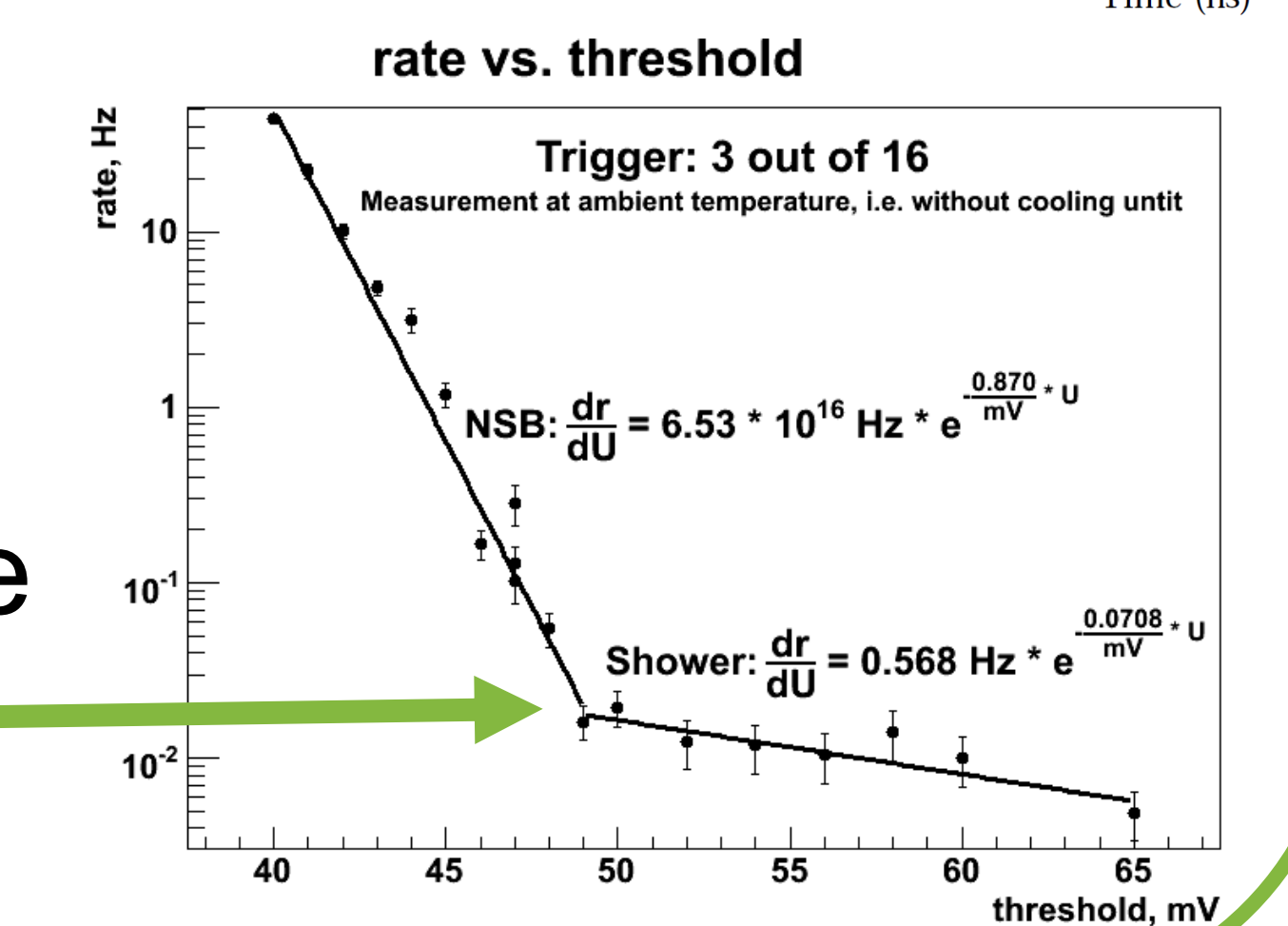
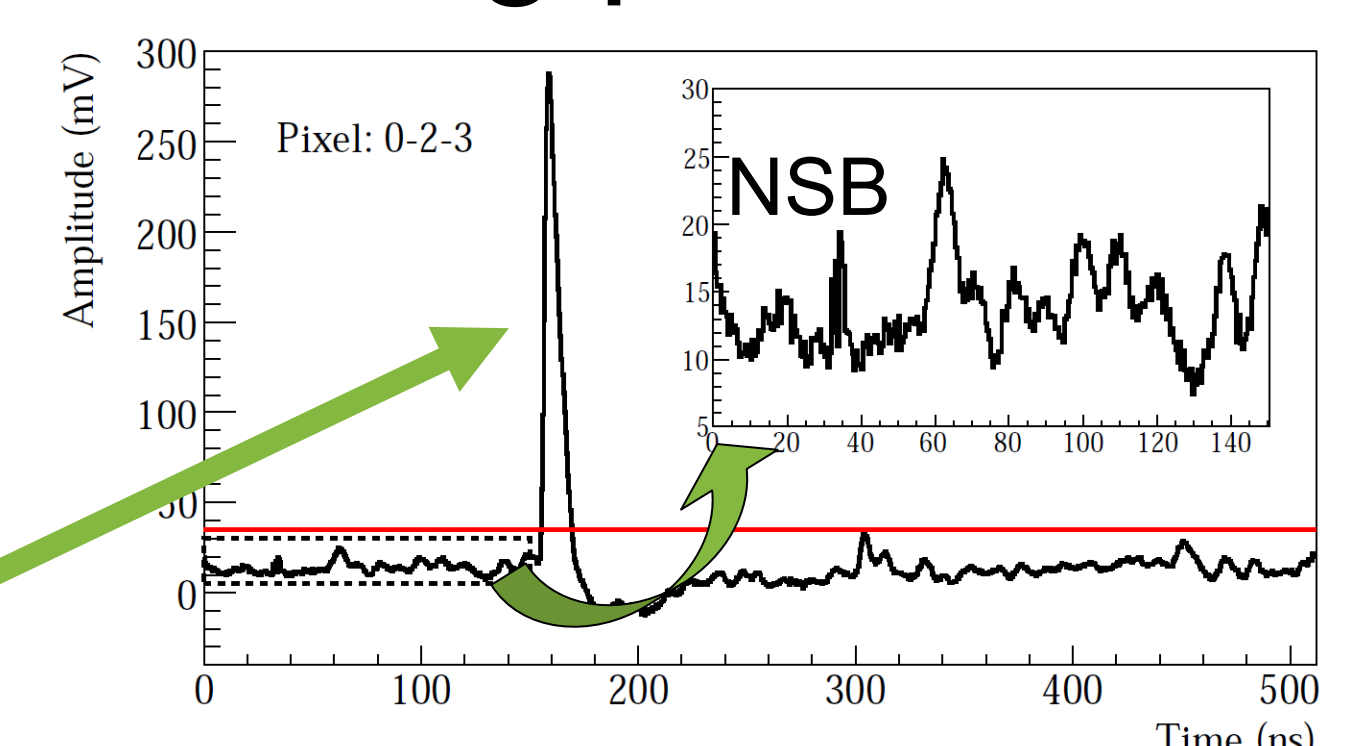


**Goal:** Observing Crab nebula next season

### First G-APD Air-Showers<sup>[5]</sup>



- Operated at ambient temperature
- Self-triggered
- Real shower pulse
- Clear transition from night sky background (NSB) to showers in the rate when increasing the trigger threshold



### Future

- Possible use in
  - MAGIC upgrade
  - CTA upgrades
  - AGIS
  - DWARF-Network<sup>[8]</sup>



**Acknowledgment** Testing novel photo-sensors for advanced Cherenkov cameras is funded through BMBF grants 05A08WW1 and 05A08PEA which are gratefully acknowledged.

**References** [1] D. Renker<sup>+</sup>, JINST 4 P04004 [2] Krähenbühl<sup>+</sup>, ICRC'09 [3] I. Braun<sup>+</sup>, NIM-A, 610, 400 [4] Q. Weitzel<sup>+</sup>, ICRC'09 [5] H. Anderhub<sup>+</sup>, JINST 4 P10010 [6] T. Bretz<sup>+</sup>, AIP 1085, 850 [7] T. Bretz<sup>+</sup>, ICRC'09 [8] M. Backes<sup>+</sup>, ICRC'09